



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,797	01/26/2004	Zhiping Shan	LUM/330/US	9767
2543	7590	11/24/2010		
ALIX YALE & RISTAS LLP 750 MAIN STREET SUITE 1400 HARTFORD, CT 06103			EXAMINER WARTALOWICZ, PAUL A	
			ART UNIT 1735	PAPER NUMBER
			MAIL DATE 11/24/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/764,797

Applicant(s)

SHAN ET AL.

Examiner

PAUL A. WARTALOWICZ

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-23 and 25-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-13, 15-23 and 25-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/12/10 has been entered.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5-13, 15-23, 25-29 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claim 21 is objected to because of the following informalities: the recitation in line 2 of "under above atmospheric" is objected to as being grammatically awkward. It is suggested that "under" is changed to --at a pressure of--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 5-13, 15-23, 25-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recitation in claim 1, line 3 of "combining a mixture consisting of a nonaqueous source of an inorganic oxide with an organic complexing and pore forming agent" and the recitation in claim 12, line 1 of "the organic complexing and pore-forming agent is combined with a glycol solvent" renders the claims indefinite. It appears that the "consisting of" type language in claim 1, line 3 is not closed language as claims 12 and 13 add a subsequent ingredient to the mixture. Therefore, the metes and bounds of claim 1 are unclear. For the purposes of examination, claim 1 is interpreted as combining a mixture consisting of a nonaqueous source of an inorganic oxide, an organic complexing and pore forming agent, and glycol.

The recitation in claim 25, line 3 of "combining a nonaqueous mixture consisting of an inorganic oxide with an organic complexing and pore forming agent" and line 8 of "wherein the organic complexing and mesopore-forming agent is combined with a glycol solvent" renders the claim indefinite. It appears that the "consisting of" type language in claim 25, line 3 is not closed language as line 8 of claim 25 recites adding a subsequent ingredient to the mixture. Therefore, the metes and bounds of claim 25 are unclear. For the purposes of examination, claim 25 is interpreted as including a glycol solvent in the mixture consisting of a nonaqueous source of an inorganic oxide and an organic complexing and pore forming agent.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 5, 7, 8, 12, 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Pinnavaia et al. (U.S. 6410473).

Lin teaches a method of making a mesoporous inorganic oxide support (Abstract, claim 11) comprising mixing an organic directing agent and a swelling agent (ammonium compound and an amine containing compound, [0068, 0083, 0084]) with a source of an inorganic oxide (appears to be non-aqueous, [0065]), and a solvent [0065], reacting the inorganic oxide with the organic complexing and pore-forming agent at a temperature of about 50-250°C, wherein the crystals produced are separated from the liquid and recovered [0073-0077] and calcined at a temperature of 200-1000°C [0110-0111]. Additionally, the temperature range of the prior art overlaps with the claimed range of a complexation temperature. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I). As the starting materials and the temperature at which the starting materials are aged of Lin is substantially similar to the starting materials and temperature at which the starting materials are aged of the claimed invention, it appears

that a water soluble complex is inherently formed in the absence of a showing to the contrary.

Regarding the limitation of dissolving the water soluble complex to provide an aqueous mixture, Lin teaches washing the precursor crystals when the precursor mixture comprises water [0180] and that the crystals, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], are separated from the liquid and recovered.

As Lin teaches filtering and washing the precursor crystals when the precursor mixture comprises water [0180] and that the crystals, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], are separated from the liquid and recovered, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to subject the crystals not including water in the precursor mixture, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], of Lin to a filtering and washing with water step in order to carry out a substantially similar separation and recovery step as described in the embodiment wherein the precursor mixture comprises water.

Additionally regarding claim 1, it appears that the washing with ample water meets the limitation of dissolving at least water soluble complex in water and decomposing at least part of the complex to provide an aqueous mixture in the absence of a showing to the contrary.

Lin fails to teach recovering and recycling at least a major portion of the organic complexing and pore-forming agent from the inorganic oxide framework by solvent extraction with the claimed solvent.

Pinnavaia et al., however, teach a method for making a mesoporous inorganic oxide (col. 1) wherein it is known to extract a templating agent with water for the purpose of recycling the templating agent (col. 8, line 60-col. 9, line 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to extract a templating agent with water in Lin in order to recycle the templating agent (col. 8, line 60-col. 9, line 5) as taught by Pinnavaia.

Regarding claims 1-3, 5, 7, 8; Lin teaches that the source of inorganic oxide comprises silica, magnesium oxide, and alumina (magnesium is included in the alkaline earth metals represented by variable (M) in para. 0056, [0056-0057]).

Regarding claim 12, Lin teaches that the solvent can be a diol (glycol, [0065]).

Regarding claim 15, Lin teaches washing the crystals with water, as described above, [0073-0078, 0180] which appears meets the limitation of decomposing the complex with a neutral pH aqueous fluid.

Regarding claim 16, Lin teaches that the crystallization temperature takes place at a temperature of 50-250°C which is so close to the range of 251-400°C that one skilled in the art would have expected a heating temperature of 250°C to have the same properties as a heating temperature of 251°C. *Titanium Metals Corp. v. Banner*, 227 USPQ 773.

Regarding claim 17, Pinnavaia teaches extraction with water (col. 8, line 60-col. 9, line 5) as described above regarding the limitation of recovering and recycling at least a major portion of the organic complexing and pore-forming agent from the inorganic oxide framework by solvent extraction with the claimed solvent. Additionally, it appears that an extraction with water would require immersing the porous material in water.

Regarding claim 18, Lin teaches that the crystalline support precursor material is calcined at a temperature of 200-1000°C [0110-0111]. This temperature range taught by Lin overlaps with the temperature range claimed. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Claims 6, 9-11, 22, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Pinnavaia et al. (U.S. 6410473) and in further view of Cao (U.S. 6660682).

Lin and Pinnavaia teach a method as described above in claim 1.

Regarding claim 6, Lin and Pinnavaia fail to teach that the inorganic oxide source is fumed silica.

Lin teaches that silica is used as a starting material [0059] but fails to specify the particular type of silica.

Cao, however, teaches a method of producing a molecular sieve (col. 1, lines 5-16) wherein the starting material for the silicon component of the molecular sieve is non limiting and includes fumed silica (col. 7, lines 45-65)

As Lin teaches Lin teaches that silica is used as a starting material [0059] and Cao teaches the starting material for the silicon component of the molecular sieve is non limiting and includes fumed silica (col. 7, lines 45-65), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide fumed silica as the starting material silica in Lin as it is known to use fumed silica as the starting material in a substantially similar process as taught by Cao.

Regarding claims 9-11, Lin and Pinnavaia fail to teach that the templating agent has amino groups (claim 9), is an alkanolamine (claim 10), specifically that the alkanolamine is triethanolamine (claim 11).

Lin, however, teaches that the templating agent contains quaternary ammonium compounds [0082].

Cao, however, teaches that the templating agent comprises a quaternary amine supplemented with triethanolamine (col. 8, lines 27-35, 40-45).

As Lin teaches that the templating agent contains quaternary ammonium compounds [0082] and Cao teaches that the templating agent comprises a quaternary amine supplemented with triethanolamine (col. 8, lines 27-35, 40-45), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide triethanolamine in Lin in order to supplement the quaternary ammonium compound directing agent as taught by Cao.

Regarding claims 22 and 23; Lin and Pinnavaia teaches a process as described above in claim 1, but fail to teach that a preformed zeolite is added to the mixture.

Cao, however, teaches a method of making a molecular sieve (col. 1, lines 5-16) wherein a zeolite material is added to a solution containing silica, alumina, and a templating agent for the purpose of seeding the solution that produces a molecular sieve (col. 9, lines 55-60).

As Cao teaches a zeolite material is added to an aqueous solution containing silica, alumina, and a templating agent for the purpose of seeding the solution that produces a molecular sieve, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to add a zeolite material to the mixture of Lin and Pinnavaia in order to seed a mixture from which a molecular sieve is produced.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Pinnavaia et al. (U.S. 6410473) further in view of Ozin (US 5320822).

Lin and Pinnavaia teach a process as described above in claim 1, but fail to teach using ethylene glycol as the solvent.

Lin does teach that the solvent is a glycol [0065].

Ozin et al., however, teach a method of making a molecular sieve (col. 1) wherein ethylene glycol is combined with the reaction mixture comprising an amine-containing templating agent for the purpose of providing a medium for crystal formation that does not interfere with the reaction (col. 6-7).

As Lin teaches teach that the solvent is a glycol [0065] and Ozin et al. teach a method of making a molecular sieve (col. 1) wherein ethylene glycol is combined with

the reaction mixture comprising an amine-containing templating agent for the purpose of providing a medium for crystal formation that does not interfere with the reaction (col. 6-7), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide ethylene glycol as the solvent in Lin in order to provide a medium for crystal formation that does not interfere with the reaction.

Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Pinnavaia et al. (U.S. 6410473) and Overbeek (US 2002/0111522).

Lin teaches a method as described above in claim 1.

Lin fails to teach aging the porous material precursor at a temperature of 20-120°C for a period up to about 48 hours.

Lin teaches that the porous crystalline support has acid active sites [0055].

Overbeek, however, teaches a method of producing a zeolite having mesoporosity [0001, 0007] wherein a zeolite precursor product is dried at a temperature of 120°C and then calcined in air by heat ramp to a temperature of 650°C for the purpose of removing water before high temperatures are reached and preserving strong acid sites [0015, 0043, 0044].

As Lin teaches that the porous crystalline support has acid active sites [0055] and Overbeek teaches a zeolite precursor product is dried at a temperature of 120°C and then calcined in air by heat ramp to a temperature of 650°C for the purpose of removing water before high temperatures are reached and preserving strong acid sites

[0015, 0043, 0044], it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the crystalline zeolite precursor of Lin subjected to a drying step at 120°C (meets the limitation of aging) and then calcined in air by heat ramp to a temperature of 650°C in order to remove water before high temperatures are reached and preserving strong acid sites.

Regarding claim 19, it appears that the temperature of the start of the calcination step (120°C) [0043, 0044] taught by Overbeek overlaps with the temperature of the aging step claimed (20-120°C). Additionally, the calcination ramp would require that the temperature of 120°C is maintained for less than 48 hours. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Regarding claim 20, the duration for which the calcination step takes place during the temperature of 121-399°C [0044] taught by Overbeek appears to meet the limitation of a drying step after the aging step in the absence of a showing to the contrary.

Regarding claim 21, Overbeek teaches that the calcination step takes place in air [0044]. This appears to teach that the calcination step takes place at atmospheric pressure absent a showing to the contrary. It appears that atmospheric pressure is so close to above atmospheric pressure that one skilled in the art would have expected it to have the same properties. *Titanium Metals Corp. v. Banner*, 227 USPQ 773. additionally, it appears that the calcination step of Overbeek [0044] takes place for less than 4 days. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I).

Claims 25, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297).

Lin teaches a method of making a mesoporous inorganic oxide support (Abstract, claim 11) comprising mixing an organic directing agent and a swelling agent (ammonium compound and an amine containing compound, [0068, 0083, 0084]) with a source of an inorganic oxide (appears to be non-aqueous, [0065]), and a solvent of a C₁-C₆ diol (glycol) [0065], reacting the inorganic oxide with the organic complexing and pore-forming agent at a temperature of about 50-250°C, wherein the crystals produced are separated from the liquid and recovered [0073-0077] and calcined at a temperature of 200-1000°C [0110-0111]. It appears that the calcination takes place at a high temperature such that the organic complexing agent would be inherently removed. Additionally, the complexation temperature range of the prior art overlaps with the claimed range of a complexation temperature. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. MPEP 2144.05 (I). As the starting materials and the temperature at which the starting materials are aged of the prior art is substantially similar to the starting materials and temperature at which the starting materials are aged of the claimed invention, it appears that a water soluble complex is inherently formed in the absence of a showing to the contrary.

Lin fails to teach dissolving the water soluble complex in water and decomposing the at least one complex to provide a porous material precursor when the precursor mixture does not comprise water.

Lin does teach filtering and washing the precursor crystals when the precursor mixture comprises water [0180] and that the crystals, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], is separated from the liquid and recovered.

As Lin teaches filtering and washing the precursor crystals when the precursor mixture comprises water [0180] and that the crystals, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], is separated from the liquid and recovered, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide subjecting the crystals, formed from a precursor mixture consisting of organic directing agent, solvent and a source of silica and alumina [0073-0075], of Lin to a filtering and washing with water step in order to carry out a substantially similar separation and recovery step as described in the embodiment wherein the precursor mixture comprises water.

Additionally, it appears that the washing with ample water meets the limitation of dissolving at least water soluble complex in water and decomposing at least part of the complex (claim 25) in the absence of a showing to the contrary.

Regarding the limitation of the claimed X-ray diffraction pattern in claim 28, it appears that the prior art of record teaches a substantially similar process as that of the

claimed invention such that the properties of the product made by said prior art process are substantially similar to the properties of the product made by the claimed process.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Cao (U.S. 6660682).

Lin teaches a method as described above in claim 25.

Lin fails to teach that the templating agent (organic complexing and pore-forming agent) is triethanolamine.

Lin, however, teaches that the templating agent contains quaternary ammonium compounds [0082].

Cao, however, teaches that the templating agent comprises a quaternary amine supplemented with triethanolamine (col. 8, lines 27-35, 40-45).

As Lin teaches that the templating agent contains quaternary ammonium compounds [0082] and Cao teaches that the templating agent comprises a quaternary amine supplemented with triethanolamine (col. 8, lines 27-35, 40-45), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide triethanolamine in Lin in order to supplement the quaternary ammonium compound directing agent as taught by Cao.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 2005/0159297) in view of Cao (U.S. 6660682) and in further view of Ozin (US 5320822).

Lin and Cao teach a method as described above in claim 26, but fail to teach using ethylene glycol as the solvent.

Lin does teach that the solvent is a glycol [0065].

Ozin et al., however, teach a method of making a molecular sieve (col. 1) wherein ethylene glycol is combined with the reaction mixture comprising an amine-containing templating agent for the purpose of providing a medium for crystal formation that does not interfere with the reaction (col. 6-7).

As Lin teaches that the solvent is a glycol [0065] and Ozin et al. teach a method of making a molecular sieve (col. 1) wherein ethylene glycol is combined with the reaction mixture comprising an amine-containing templating agent for the purpose of providing a medium for crystal formation that does not interfere with the reaction (col. 6-7), it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide ethylene glycol as the solvent in Lin and Cao in order to provide a medium for crystal formation that does not interfere with the reaction.

Allowable Subject Matter

Claim 14 is allowed.

The following is an examiner's statement of reasons for allowance: the prior art of record fails to teach or suggest combining a mixture consisting of a nonaqueous source of an inorganic oxide with an organic complexing and pore-forming agent in combination with the other limitations of claim 14. The closest prior art of record, US 2005/0159297, teaches a method of producing a mesoporous catalyst support using a solvent (alcohols, diols (glycol), and/or water [0065]). Additionally, it would have not been

obvious to use provide a mixture consisting of non-aqueous source inorganic oxide and organic complexing and pore-forming agent as US 2005/0159297, and the other art cited, stress the importance of a solvent present in the mixture.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul A Wartalowicz/
Examiner, Art Unit 1735